IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

RONALDUS MARIA AARTS

Atty. Docket

NL000467

Filed: CONCURRENTLY

Title: METHOD AND APPARATUS FOR REDUCING THE WORD LENGTH OF A DIGITAL INPUT SIGNAL AND METHOD AND APPARATUS FOR RECOVERING A DIGITAL INPUT SIGNAL

Commissioner for Patents, Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to calculation of the filing fee and examination, please amend the above-identified application as follows:

IN THE CLAIMS

Please add new claim 16.

16. Signal processing apparatus, comprising:

means for adding a pseudo-random noise signal to the digital input signal (M_i) to obtain an intermediate signal, the pseudo-random noise signal being defined by noise parameters; and

means for quantising the intermediate signal having a word length of n bits to a reduced word length signal having a word length of m bits, n being larger than or equal to m,

the quantising means includes a first transfer function which is non-linear, the first transfer function being defined by non-linear device parameters.

Please amend Claims 1, 5-7, 9-10, 12 and 14 to be in the form as follows. A marked up copy of the claims is included in an appendix following this amendment for the Examiners convenience.

1. Method for reducing the number of bits of a digital input signal (Mi) comprising the steps of

adding a pseudo-random noise signal (Na) to the digital input signal (Mi) to obtain an intermediate signal (Di), the pseudo-random noise signal (Na) being defined by noise parameters (Np); and

quantising the intermediate signal (Di) having a word length of n bits to a reduced word length signal (Me) having a word length of m bits, n being larger than or equal to m,

quantising the intermediate signal (Di) includes a first transfer function which is non-linear, the first transfer function being defined by non-linear device parameters (NLDp).

5. Method according to claim 1, in which the amplitude of the noise signal (Na) is at least equal to a predetermined noise value.

6. Method according to claim 1, in which noise shaping techniques are applied to obtain the noise signal (Na).

7. Method according to claim 1, in which the reduced word length signal (Me), the non-linear device parameters (NLDp) and/or the noise parameters (Np) are recorded on a recording medium (13).

9. Method according to claim 1, comprising the further step of providing a difference signal, the difference signal being equal to the intermediate signal (Di) minus the reduced word length signal (Me).

10. Method for recovering an output signal (Mo) from a reduced word length signal (Me) provided by the method according to claim 1, comprising the steps of

quantising the reduced word length signal (Me) having m bits to a decoded signal (Md) having n bits, the quantising being defined by a second transfer function and the second transfer function being the inverse of the first transfer function.

12. Signal processing apparatus, comprising a pseudo-random noise generator (12) for generating a noise signal (Na) being defined by noise parameters (Np), an addition element (11) connected to the noise generator (12) for adding the noise signal (Na) to an digital input signal (Mi) to provide an intermediate signal (Di), and a first quantising element (10) connected to the addition element (11) for transforming the intermediate signal (Di) having a word length of n bits into a reduced word length signal

(Me) having a word length of m bits, n being larger than or equal to m, wherein,

the quantizing element (10) has a non-linear transfer function, the non-linear transfer function being defined by non-linear device parameters (NLDp).

14. Signal decoding apparatus for recovering an output signal (Mo) from a reduced word length signal (Me) provided by the signal processing apparatus according to claim 12, comprising

a second quantisation element (14) having a second transfer function for transforming the reduced word length signal (Me) into a decoded output signal (Md), the second transfer function being the inverse of the first transfer function.

Please cancel claim 13.

REMARKS

The foregoing Preliminary Amendment to the claims was made solely to avoid filing the claims in the multiple dependant form so as to avoid the additional filing fee.

The claims were not amended in order to address issues of patentability and Applicant respectfully reserves all rights he may have under the Doctrine of Equivalents. Applicant furthermore reserves his right to reintroduce subject matter deleted herein at a later time during the prosecution of this application or continuing applications.

Respectfully submitted,

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APPENDIX A

1. Method for reducing the number of bits of a digital input signal (Mi) comprising the steps of

adding a pseudo-random noise signal (Na) to the digital input signal (Mi) to obtain an intermediate signal (Di), the pseudo-random noise signal (Na) being defined by noise parameters (Np); and

quantising the intermediate signal (Di) having a word length of n bits to a reduced word length signal (Me) having a word length of m bits, n being larger than or equal to m,

~~characterised in that~~

~~the step of~~ quantising the intermediate signal (Di) ~~comprises~~ includes a first transfer function which is non-linear, the first transfer function being defined by non-linear device parameters (NLDp).

5. Method according to ~~one of the proceeding claims~~ claim 1, in which the amplitude of the noise signal (Na) is at least equal to a predetermined noise value.

6. Method according to ~~one of the proceeding claims~~ claim 1, in which noise shaping techniques are applied to obtain the noise signal (Na).

7. Method according to ~~one of the proceeding claims~~ claim 1, in which the reduced word length signal (Me), the non-linear device parameters (NLDp) and/or the noise parameters (Np) are recorded on a recording medium (13).

9. Method according to ~~one of the proceeding claims~~ claim 1, comprising the further step of providing a difference signal, the difference signal being equal to the intermediate signal (Di) minus the reduced word length signal (Me).

10. Method for recovering an output signal (Mo) from a reduced word length signal (Me) provided by the method according to ~~one of the claims 1 through 8~~ claim 1, comprising the steps of

quantising the reduced word length signal (Me) having m bits to a decoded signal (Md) having n bits, the quantising being defined by a second transfer function and the second transfer function being the inverse of the first transfer function.

12. Signal processing apparatus, comprising a pseudo-random noise generator (12) for generating a noise signal (Na) being defined by noise parameters (Np), an addition element (11) connected to the noise generator (12) for adding the noise signal (Na) to an digital input signal (Mi) to provide an intermediate signal (Di), and a first quantising element (10) connected to the addition element (11) for transforming the intermediate signal (Di) having a word length of n bits into a reduced word length signal

(Me) having a word length of m bits, n being larger than or equal to m, ~~characterised in that~~ wherein,

the quantizing element (10) has a non-linear transfer function, the non-linear transfer function being defined by non-linear device parameters (NLDp).

~~13.~~ ~~Signal processing apparatus according to claim 12, in which the signal processing apparatus is arranged to execute the method according to one of the claims 1 through 9~~.

14. Signal decoding apparatus for recovering an output signal (Mo) from a reduced word length signal (Me) provided by the signal processing apparatus according to claim 12 ~~or 13~~, comprising

a second quantisation element (14) having a second transfer function for transforming the reduced word length signal (Me) into a decoded output signal (Md), the second transfer function being the inverse of the first transfer function.